DOCUMENT RESUME

ED 217 861 IR 010 243

AUTHOR Kaungamno, E. E.
TITLE Scientific and Technical Information for Developing Countries. Occasional Paper No. 35.
INSTITUTION Tanzania Library Service, Dar es Salaam.
PUB DATE Jan 78
NOTE 10p.; Paper presented to the Tanzania Library Association Seminar (Dar es Salaam, January 2-6, 1978).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Check Lists; *Developing Nations; *Information Dissemination; Information Services; *Sciences; Social Change; Technological Advancement; *Technology; *Technology Transfer
IDENTIFIERS Information Transfer; *Scientific and Technical Information

ABSTRACT

This paper discusses the role of scientific and technical information as an important resource for effecting technological, social, cultural, and economic change within emerging Third World nations. The topics addressed in the course of the discussion include the role of science and technology in development, the transfer of technology from one culture to another, the selection of appropriate technologies by Third World countries, scientific and technological information as a catalyst in technology transfer, and the nature of the information transfer process. A reference list is included, and a checklist designed to help a developing country in strengthening those elements of the information structure which are appropriate to its capabilities, resources, and needs is appended. (JL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED217861

SCIENTIFIC AND TECHNICAL INFORMATION FOR DEVELOPING COUNTRIES

* Paper presented to the Tanzania Library Association Seminar
DAR ES SALAAM
2nd -6th January, 1978

and

Used as a discussion paper in Workshop for Library and Information Workers.
National Central Library, Dar es Salaam
16th - 20th June 1980.

By
KAUNGAMNO, E.E. B.A. M.L.S.
(Director of Library Services)

IR010243

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
E.E. Kaungamno
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Scientific and Technical Information for developing countries.

Libraries and information units, in any country, have a vital role to play in development. They must supply information for development particularly to planners and decision makers. The information supplied must be in priority fields in line with the country's national development plan. The vital information badly needed for development is in the fields of science and technology.

The role of science and technology in development

First it is important to distinguish between science and technology. Briefly technology is "know-how" which helps to produce wealth while science is "know-why" which produces knowledge. Science and technology are being increasingly resognized as powerful factors in economic growth. However science and technology must be applied to economic development appropriately. "New knowledge by itself makes no contribution to economic growth, nor does an invention generated by scientific or technical advances. Only when the knowledge or the invention is incorporated effectively into the production system can economic growth result. One of the key factors in growth is innovation, the culminating stage of total scientific and technological effort"[1] It is important to bear in mind that "in most developing countries, lack of scientific and technological knowledge is seldom a critical limiting factor- the main abstacles to application are economic and social, including education, communications, acceptability of new ideas, administrative effectiveness, business enterprise and political leadership. Social and cultural traditions are often positive barriers to change, and economic growth will require extensive and intensive changes in human values and attitudes, as well as in social and political structures. Only within this broader context of development, can sicence and technology make an effective contribution".[2] Science and Technology must be applied to subject fields of highest priority. In most developing countries, Tanzania included of course the areas of priority are agriculture, commerce and industry, public health and education.

Transfer of technology

The process of transfering technological know-how from one culture to another and particularly from industrialized to less industrialized countries is complicated. Technology must be tailored to suit physical, economic and social conditions of the country. The capacity of a country to assimilate new technology depends on both its capacity to adapt the technology to its

own conditions and its capacity to adapt itself to the needs to technology. The process of effective transfer of technology in a developing country depends on the analysis of complex and interrelated factors which offer resistance to change.

Choice of technology

Third World countries have problems of striking the right balance, between their development goals and labour supply conditions on the one hand and imported technologies from advanced countries on the other. Among other things advanced technologies tend to be characterized by the use of less labour per unit of output. The new technologies are also capital intensive in that they require large plants and equipment. Such technology is difficult to apply in developing countries lacking capital. Therefore in choosing appropriate technology, developing countries have problems of evolving suitable labour-intensive, capital-saving and intermediate technology which can, among other things, solve unemployment problems.

Scientific and technological information

Scientific and technical information enable the transfer of technology from one country to another. "Scientific and technical information is an essential ingredient of economic growth and industrial development. It helps assure that capital investment is effectively utilized, that unwanted duplication is avoided and that development plans can be based on firm data, rather than mere wishes."[3]

For developing countries particularly scientific and technical information should be regarded as an essential element of the "technical assistance" transfer process along with machines and other material aid. This fact is unfortunately often ignored with the result that in most cases experts return to their homes without having set up a firm self- perpetuating information base in the countries they have been advising No wonder, in the long run, the projects they have established become tombstones. The application of scientific and technical information should among other things contribute towards:[4]

a) the increase of food production
b) the use of new industrial products and increased industrial production
c) improved use and management of natural resources.
d) reduction or control of various diseases and improved health care and
e) more effective development and use of indigenous energy resources.

Developing countries need information assistance from developed countries. They must turn to them to obtain up-to-date scientific and technical know-how needed for development. There is a widening information gap between advanced and less advanced countries which must be reduced or removed, if possible. It has been estimated for example that developing nations produce less than 5% of the world's scientific literature.[5]

Information Transfer

Information transfer is a complex process. It depends, among other things on the information infrastructure of the country - particularly its capability to identify the types of sources of information suitable for its needs as well as the ability to acquire and disseminate information effectively. The major elements of information infrastructure are:

1. A nucleus of physical information resources (libraries, documentation centres, archives, etc.)
2. A supply of trained and information personnel
3. Linkages to significant economic, educational, and R & D sectors - internal and external
4. Two-way communication channel with users
5. An organisation system that coordinates together resources, personnel and linkages, and
6. National policies that promote the systematic development of the infrastructure

The appended checklist should help a developing country in strengthening those elements of the information structure which are appropriate and tailored to its capabilities, resources and needs. Many developing countries do not, or have if any, information infrastructure which is not well developed and as a result they are unable to identify their information needs adequately, to acquire relevant information, to adapt it to local requirements or to disseminate it to those who need it. An adequate information base has several advantages: It can take advantage of existing knowledge and "know-how" achieved in other countries. An infrastructure which can draw upon world wide sources of scientific and technical information will serve as a link between the users of the individual country and the producers of information elsewhere. Accessibility to externally generated information can also reduce a country's need to do expensive and time-consuming research which can be efficiently conducted elsewhere. Furthermore, adequate information base can help reduce the need for foreign experts and encourage local training and use of indigenous manpower.

However, a prerequisite for the effective transfer of information is the awareness or recognition for its need and indispensability for developments. Such an awareness does not exist or is very little understood in developing countries. Indeed a recent report of the Organization for Economic Cooperation and Development (OECD) states that:

> "Perhaps the most important event in thenext decade will be the recognition of the true value of information the right information, reliable and relevant to our needs, available in a useful form to all those who need it."[6]

It must also be recognized also that we are living in an Information Age an Era of the so called "information explosion" where, it is said, the number of technical journals currently published throughout the world exceeds 100,000 and that the total body of technical information is now doubling every ten years. Developing countries lacking a computer - utilization base or the requisite trained manpower will find it difficult to make use of costly computer - based information services. However with existing modern technology, it is gratifying to note that such an explosion can be handled rapidly and effectively. "Through a vast array of electronic tools and techniques, mankind is able to accumulate, organize, store, interpret, retrieve and transmit information on a worldwide scale, in a volume, at a speed, and with accuracy that would have been impossible barely two decades ago... As advance has followed advance, the cost of processing information has declined. Since the 1950's, the cost of performing 100,000 calculations on an IBM computer has fallen from $1.26 to less than one cent - and the downward trend continues."[7] Modern technology is there at the disposal of developing countries. Ways and means must be found to exploit it; otherwise, forever, we "will run while they walk."

References

1. Jones, Graham. The role of Science and technology in developing countries. London. Oxford University Press. 1971. p.8

2. Ibid p. 7

3. Academica Sinica Republic of China and National Academy of Sciences, U.S.A. Scientific and technical information needs and resources in the Republic of China (Taiwan). National Academy of Sciences Washington. DC. 1974. p. 7

4. Board on Science and Technology for International Development. Scientific and Technical Information for developing countries. National Academy of Sciences. Washington DC. 1972. p.6

5. Ibid p.8

6. Ibid p.9

7. Ibid p.6

8. IBM. Information: there's growing agreement that it's name of the age we live in. Foreign Affairs July, 1977. pp. x-xi

APPENDIX

INFORMATION INFRASTRUCTURE: A CHECKLIST*

I. Governmental Policy for Information

A. Does the government have a national policy for scientific research and developmert?

B. If so, does it have a national policy for scientific and technical information?

C. Is there a government agency serving as a focus for information policy formulation?

D. What percent of the national research and development budget is spent on scientific and technical information?

II. Manpower Resources

A. Existing

1. What is the number of trained personnel? What is the estimated national need?

2. To what extent has their training been indigenous; to what extent outside the country?

3. Are the information and library professions, and information specialists in other professions suitably compensated?

4. Are there nationally recognized standards for education and training in the information sciences?

B. Potential for Training Manpower

1. What is the capacity of indigenous training institutions?

2. Is there fiscal support for trainees - within, or outside the country?

3. Do U.N. agencies or nongovernmental organizations (including private companies) sponsor indigenous training programs? Fellowships for training overseas?

III. Information Resources and Facilities

A. Libraries, specialized information and documentation center

1. What is the volume, character, and quality of information resources? Have they been selected in relation to development needs?

2. Are they appropriately distributed geographically in relation to user needs?

3. Have they been adequately organized for use?

4. What types of information services do the centers provide? Are they appropriate to the needs?

5. What populations are being served? How do the centers reach them?

6. What is the level of fiscal support given these institutions?

B. Publication Capabilities

1. What is the status of the scientific and technical periodical press? Book publishing?

2. What abstracting and indexing services exists?

3. What is the status of scientific and technical book imports?

4. What translation capabilities exist in the sciences and technologies?

C. Computer Capabilities

1. What resources (hardware, trained manpower) exist?

2. What is the overall status of computer application?

3. Are proposed tasks significant and large scale enough to justify computer application? Can economies be demonstrated?

IV. Institutional Resources

A. What government ministries and programs have roles in technology transfer through information.?

B. What regional or intergovernmental economic development organizations operate within the country for the same purpose?

C. What nongovernmental organizations, including scientific and technical societies, have related interests?

D. Do the universities and technical colleges provide services to industry for technology transfer?

E. What role does industry, including multinational companies, play in effecting technology transfer?

*Source:

Board on Science and Technology for International Development. Scientific and Technical Information for Developing countries. National Academy of Sciences. Washington. DC. 1972. pp. 26-28.